

# Standardization and “industrialization” of construction methods in building construction

**Written by:**

Carlo Sturm  
Manager, FA – RE & Partn  
Deloitte The Netherlands  
csturm@deloitte.nl

Jurriën Veldhuizen  
Partner, FA – RE & Partn  
Deloitte The Netherlands  
jveldhuizen@deloitte.nl

Peter Sanders  
Partner, CONS - STRATEGY,  
ANALYTICS&M&A  
Deloitte The Netherlands  
psanders@deloitte.nl

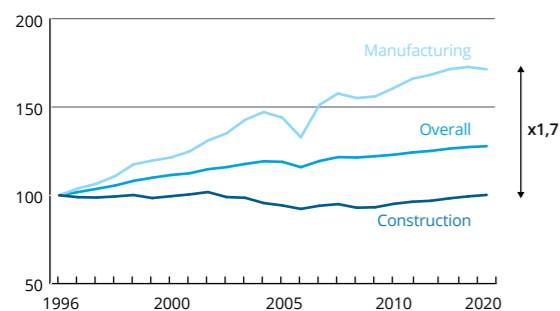


## Industrial opportunities as a solution for the current challenge

Construction margins are under pressure world wide due to shortages in skilled labor, (material) supply chain, low entry barriers and a shortfall in productivity growth (Fig 1), while climate goals increasingly challenge traditional construction methods and materialization (Net Zero Challenge). In the search for increased efficiency and predictability, control over supply chains, better margins and a workaround for labor shortages, industrial construction methods have been developed over the last decade. The acceleration in innovation and digitization observed in the construction industry in recent years has resulted in the need for industrialized methods.<sup>1,2</sup>

How should you, as an incumbent/traditional construction company, strategically position yourself within this industrial construction market and develop a profitable business model?

**Figure 1: Standardized labor productivity growth (28 EU countries) of various industries 1996 - 2019**



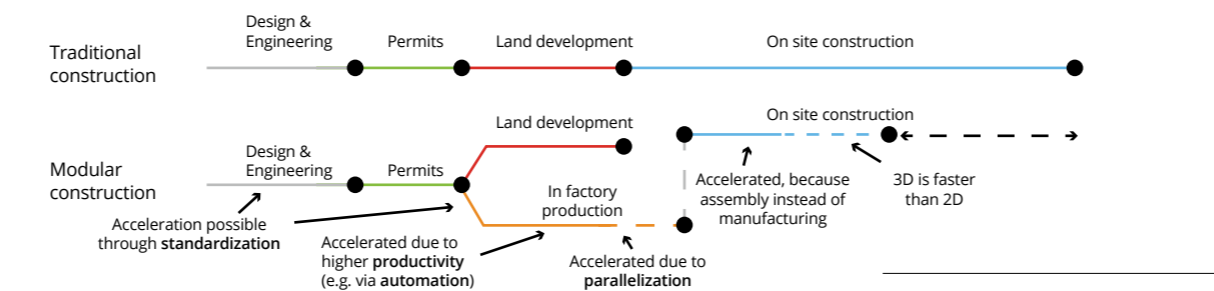
1. Deloitte, "Point of View on Digital Construction; The business case of incorporating digital technologies into the construction industry", Deloitte, 2019, <https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/energy-resources/deloitte-nl-eri-point-of-view-digital-construction.pdf>,  
 2. Deloitte, "Global M&A Construction Monitor", Deloitte, 2019, <https://www2.deloitte.com/gr/en/pages/energy-and-resources/articles/global-ma-construction-monitor-2019.html>

## Standardization and "industrialization" of construction methods in building construction

We see the combination of standardization and prefabrication in factory environments as drivers for the industrialization of the construction industry. This provides possibilities for customization and flexibility, and enables sequencing in the construction process (Fig. 2) giving rise to savings of up to 50% in construction time and costs.

- Standardization of procedures leveraging digital solutions leads to cost reductions, fewer interface and tolerance problems, increases certainty in terms of outcomes, reduces error margins, and increases the scope for reuse, economies of scale and learning effects.
- Prefabrication, both 2D & 3D, increases construction efficiency, reduces on-site constrains (weather, personal, safety), allows for extensive automation, decreases delivery time and comparative costs, and allows for new kinds of materials

## Industrial construction time saving



## Green goals further stimulate the industrial construction trend

Buildings and construction processes combined are responsible for 39% of all carbon emissions worldwide; 11% can be traced back to the construction process and 28% are operating emissions.<sup>1</sup> By going industrial, construction companies aim to significantly reduce waste (50%) and increase quality.<sup>2,4,5</sup> Through the increased potential for reuse, limitation of waste, and reduced energy consumption, achieved by minimizing on-site processes and reducing transportation, industrial construction is said to reduce carbon emissions by 40% compared to traditional construction.<sup>3,6</sup> By using biobased materials such as wood, carbon negative construction becomes more feasible. Factory environments are ideal for applying these biobased materials. All in all, the expected world wide sustainability targets could increase the competitive edge of modular construction methods in the construction industry.

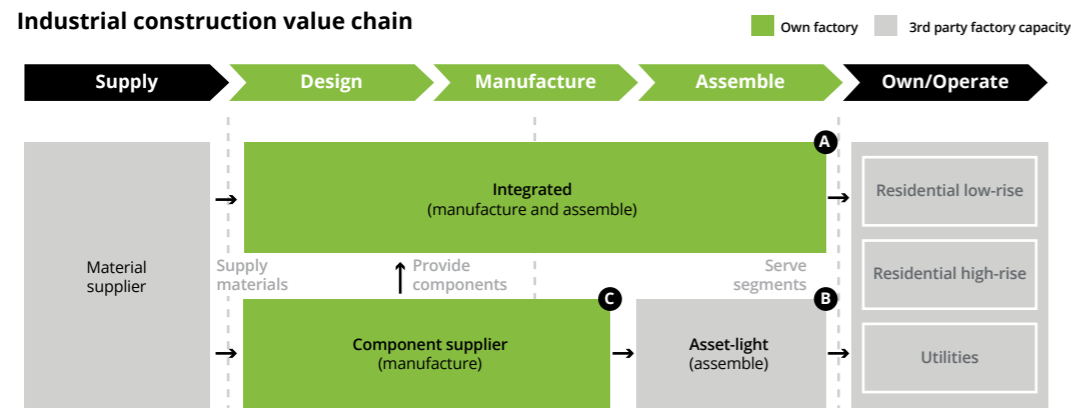
1. World Green Council, "Bringing Embodied Carbon Upfront", World Green Council, 2019, <https://www.worldgbc.org/news-media/bringing-embodied-carbon-upfront>  
 2. Mohamed Osmani & Paola Villoria Sáez, "Chapter 19: Current and emerging construction waste management status, trends and approaches", in: "Waste a Handbook for Management", Elsevier, 2019  
 3. Hanbyeol, J., Yonghan, A. & Seungjun R. "Comparison of the Embodied Carbon Emissions and Direct Construction Costs for Modular and Conventional". Buildings, 2022, <https://www.mdpi.com/2075-5309/12/1/51>  
 4. LowneyArch, "Insight: Can Utilizing Modular Construction Lower Our Carbon Footprint?" LowneyArch, 2021, <https://lowneyarch.com/insight-can-utilizing-modular-construction-lower-our-carbon-footprint/>  
 5. Hao, J., Chen, Z. & Loehlein, G., "Quantifying construction waste reduction through the application of prefabrication: a case study in Anhui, China", Environmental Science and Pollution Research, 2021  
 6. Rebecca Hunt, "Is climate change modular housing's ace card?", CBRE, 2021, <https://www.cbre.co.uk/research-and-reports/about-real-estate/blogs/is-climate-change-modular-housings-ace-card>

## Strategic positioning within the industrial construction value chain

The traditional construction value chain will change in the coming years. For an incumbent company, a move to industrial construction requires strategic positioning within the new value chain. In this value chain (Fig. 3) we observe three key positions:

- Integrated companies manufacture 2D/3D units in owned, offsite factories before onsite assembly, banking on controlling the supply chain. Integrated players assume lowest cost via scale, automation and standardization, while factory utilization is key for enhancing profit.
- Asset-light players source 2D/3D units from multiple component suppliers banking on digitalization and parametric design. Value is added through coordination and design standardization.
- Component suppliers manufacture 2D/3D components for integrated and asset-light players. Differentiation through specialization and/or lowest costs.

A profitable business case through industrial construction is not a given, companies should strategically determine their position and be consistent in their actions to strengthen this position.



## Varying market dynamics

Levels of construction process industrialization vary in each region. Therefore, industrialized construction trends and movements should be viewed in terms of local market dynamics. For example, the Japanese industrial construction market has reached a mature phase in its lifecycle<sup>1</sup>. In Europe, Sweden is market leader with 80% of the for-housing sector structures used being prefabricated in factories<sup>2</sup>. In more traditional construction countries, industrial construction penetration is significantly lower, such as in the Netherlands where it accounts for approx. 14%<sup>2</sup>. Surging material prices, labor scarcity and sustainability drive growth of industrial construction in the more traditional countries. In Northwestern Europe we see incumbent companies integrating suppliers in their value chain to develop wood-based modular construction concepts<sup>3</sup>. On the other hand, we see Japanese industrial construction companies trying to gain ground overseas through acquisition, bringing considerable experience in scaling industrial residential construction<sup>4</sup>.

## Incumbents, it is time to act!

Although industrialization is picking up pace, leading to more predictability, new material use and limiting costs, traditional construction is in many places still the norm and in many cases more profitable. A profitable industrial business case is not yet a given. Nevertheless, an incumbent construction company should develop its strategy for industrial construction in order to stay relevant in the residential and high rise construction market. To effectively adopt the opportunities of industrialization, companies should consider:



**Creating a unique viewpoint on industrial construction** – Explore the local and international competitive landscape and market, and define opportunities.



**Developing a strategy and being consistent** – Develop a strategic agenda which answers questions such as where to play, how to win and what is my value chain position, and stick to these strategic choices.



**Capturing and creating value** – Execute with agility, implement and learn – move beyond internal optimization and a traditional business case and create value for the company and its client.



Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited ("DTTL"), its global network of member firms, and their related entities. DTTL (also referred to as "Deloitte Global") and each of its member firms are legally separate and independent entities. DTTL does not provide services to clients. Please see [www.deloitte.nl/about](http://www.deloitte.nl/about) to learn more.

Deloitte is a leading global provider of audit and assurance, consulting, financial advisory, risk advisory, tax and related services. Our network of member firms in more than 150 countries serves four out of five Fortune Global 500® companies. Learn how Deloitte's approximately 264,000 people make an impact that matters at [www.deloitte.nl](http://www.deloitte.nl).

This communication contains general information only, and none of Deloitte Touche Tohmatsu Limited, its member firms, or their related entities (collectively, the "Deloitte network") is, by means of this communication, rendering professional advice or services. Before making any decision or taking any action that may affect your finances or your business, you should consult a qualified professional adviser. No entity in the Deloitte network shall be responsible for any loss whatsoever sustained by any person who relies on this communication.

© 2022 Deloitte The Netherlands

1. Mordor Intelligence, "Japan Prefabricated Buildings Industry Study", Mordor Intelligence, 2020  
 2. Mordor Intelligence, "European Prefabricated Buildings Market – Growth, Trends, COVID-19 Impact and forecasts (2022-2027)", Mordor Intelligence, 2021  
 3. Global Construction Review, "BAM buys wooden façade producers to strengthen prefab muscle" GCR, 2021, <https://www.globalconstructionreview.com/bam-buys-wooden-facade-producers-strengthen-prefab/>  
 4. Global Construction Review, "Japanese prefab housing giant Daiwa targets Europe with Jan SnelAcquisition", GCR, 2020, <https://www.globalconstructionreview.com/japanese-prefab-housing-giant-daiwa-targets-europe/>